Letters to the Editor

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8

FAVOURED DURATION OF SUDDEN IONOSPHERIC DISTURBANCE

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It is wellknown that the duration, i.e., the interval of time between the earliest indication of sudden ionospheric disturbance and its end, of any individual disturbance may vary from a few minutes to about 100 min. or more in some cases. However, during the present analysis of the data on various ionospheric solar flare effects for 1956-58, it is observed that the duration of SID as noted by the time interval of start and end of a short wave radio fade-out shows a typical behaviour. For a certain period such as a season or a year, though an indivisual fade-out may have any duration extending from a few minutes to about 100 min. or more, large number of SIDs tend to have a certain favoured duration which closely depends upon solar activity for that period under consideration.

It is observed that during the year 1956 nearly 36% of SIDs have their duration between 11 to 20 min. with a favoured duration of 15 min. This later factor being obtained graphically from a plot of number of fade outs against their duration for the year. For 1958, a year of intense solar activity, 35% of the SIDs show duration between 21 to 30 min. centred round the favoursed duration of 26 min. Table I shows the first favoured duration interval and favoured duration along with the annual sunspot numbers for the years 1956 to 1959. Data for a few months for 1957 and 1959 is lacking but the general trend is quite apparent. Data for 1936 (Berkner and Wells, 1937) has been analysed for comparison.—Unfortunately sufficient and continuous data was not available in literature particularly for the low sunspot activity period of 1941-43. Linear dependence of

favoured duration on the corresponding sunspot number of the year may be noted from the Table.

As nearly 35% of the total SIDs have their durations lying in a first favoured duration interval, the next 22% or so of the disturbances have their duration in a second favoured duration interval. Again, maximum number of the disturbances of first favoured duration interval of the year occur in equinoctial months while the large number of SIDs during summer and winter show the duration of the second favoured duration interval.

This concept of favoured duration, if extended to the time of growth and decay of the disturbance, may indicate the most general process underlying the ionization and response of the ionospheric region of the disturbance for a certain average solar activity of that period and each individual SID with its deviation from the general process may be considered as related to the specific solar events.

The period under consideration is that of high solar activity and a large number of fade outs have been reported. It is found that the present analysis of this data does not confirm the observation of McIntosh (1951) that April is the month of greatest frequency of occurrence of short wave radio fade outs. Again in general, the fadeouts occur more frequently in morning than in afternoon as is reported in case of various ionospheric solar flare effects. (McIntosh 1951, Shain and Mitra, 1954). However for some winter and equinoctial months the ratio of number of fadeouts in forenoon to the number in afternoon was much less than one; thus supporting the remarks (Shain and Mitra 1954) that there is no real forenoon bias in occurrence of SIDs and the observed effect may be certainly due to the atmospheric interference.

TABLE 1

Year	Annual sunspot number	Favoured duration interval (min.)	Percentage of SID in favoured duration interval	Favoured duration (min.)
1956	80	0–10	54%	4
1956	106	11–20	36%	15
1957	171	11–20	35%	20
1958	192	21–30	35%	26
1959	182	21–30	30%	23

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